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The Impact of Storm Damage on Small-scale Forest Enterprises in the South-west of Germany

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Storm damage is considered to be one of the most important risk factors for forestry in Central Europe. At the end of 1999 a centennial storm event hit the south-east of Germany and Switzerland, as well as central and western parts of France, and caused great damage. Forests in Baden-Württemberg were severely affected, with 30 M m^3 of timber felled due to storm damage, three times the amount of the normal annual cut. Approximately 5.2 M m^3 of the wind-thrown timber was in private forests, of which most were located in the central Black Forest. Smaller shares came from other regions of Baden-Württemberg. The economic damages and strategies of the forest owners were analysed in a multi-dimensional approach, using economic data from long-term accountancy networks, in combination with the results of a qualitative opinion poll amongst private forest owners. A storm coefficient was devised as a suitable indicator for the concerns of owners or ownership classes. The predicted operating income of the private forest owners is related to this coefficient. Cash flow simulations suggest that enterprises with a coefficient of more than 100% suffer from a reduction of their economic base. By combining the results derived from the accountancy networks with findings from the opinion poll it was found that the owners took an active decision towards self-processing and were able to save more than 30 M € by choosing this strategy. State support which was provided in a variety of ways is also identified. A range of programs and institutional support measures mitigated the impact of the storm disaster. The effectiveness and acceptance of these measures by forest owners was confirmed by the results of the opinion poll.

Keywords: Black Forest, storm events, wind-thrown timber, disaster response strategies

THE FORESTS AND FOREST OWNERS OF BADEN-WÜRTTEMBERG AND THE HISTORICALLY DEVELOPED PRIVATE-PUBLIC PARTNERSHIP

Baden-Württemberg is the third largest of 16 states of the Federal Republic of Germany and is located in the south-west of the country. It borders France in the west (Rhine valley), and Switzerland in the south, and is well known internationally for the Black Forest (Schwarzwald). Though Baden-Württemberg is densely populated (293 inhabitants/km^2), forests comprise 39% of the land area.

Three types of forest ownership exist in Baden-Württemberg: The federal state owns 24%, private forest owners 38% (about 260,000 forest owners with an average property area of 1.3 ha) and communities 37%, i.e. 1,000 towns and municipalities with an average property size of 500 ha. Parts of these properties are bordering on each other and are fragmented and meshed together.

For historical reasons, Farm Forest Enterprises (FFE) play an important role in the Black Forest, with many mixed FFEs more or less dependent on their income from forestry. More detailed information is provided in Brandl *et al*. (1999), Mijacz (2000) and Selter (2003).

Mixed FFEs derive their income mainly from three sources. On average, 36% of their income is obtained from various activities including tourism, municipal services and other off-farm income (dependent employment). With an average of 35%, agriculture has a similar share of the total income for the owner families. About 29% of the income is derived from the forest part of their enterprises. There are great differences between individual enterprises, but for most the contribution of forestry exceeds 20% (Mijacz 2000). The productivity of forestry in respect of labour efficiency (in terms of income return per hour), is much higher for forestry than other income earning farm practices, and underpins the viability of the FFE. Relative to activities in tourism or municipal services, differences of up to 300% in favour of forestry can be identified (Figure 1). That is why Selter (2003) came to the conclusion that forestry seems to be a relevant complementary condition for the continuing existence of agriculture in the region. This indicates why forestry is also an important part and stabilising element of landscape management in the Black Forest, and as a consequence a severe storm must be viewed as an endangering event for these wooded regions and their socio-economic sustainability.

The forest administration of Baden-Württemberg is organised as a forest service organisation for all forest owners. It consists of 849 forestry districts (each led by a forestry officer), with an average size of 1,025 ha, and properties of all types of forest ownership. On average, seven forest districts are administered by one forestry office with 7,500 ha of forest land. The headquarters of the forest administration is located at the Ministry for Food and Rural Development in the state capital Stuttgart. The national forest service manages the state forest and is responsible for assistance and technical support of other forest owners as well as for the distribution of financial allowances. The state forest administration offers a service to other owners to manage their forests on the basis of a management contract, especially for community forests. In addition, forest offices are supervising authorities and are thus responsible for example for ensuring that forest owners act according to forest law.

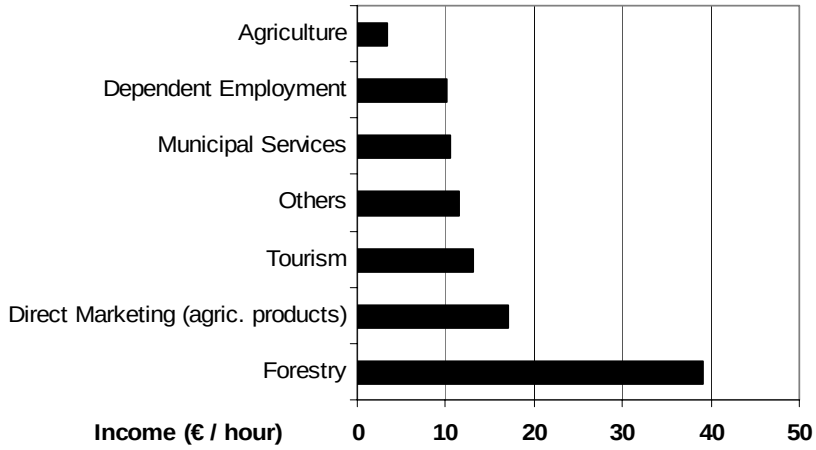

Figure 1. Income per hour of various activities of mixed FFEs

HURRICANE LOTHAR AS A CENTENNIAL STORM EVENT

On 26th of December 1999 an extraordinary climatic situation arose. As a result of the collision of huge warm and cold air masses over the Atlantic Ocean, a low-pressure system moved over France, crossed the Black Forest and collapsed in the eastern parts of Baden-Württemberg. The meteorological office in Karlsruhe, located about 50 km from the centre of the storm, recorded the air-pressure movements shown in Figure 2. The decrease of air pressure between 1.00 am and 1.00 pm on December 26th (points 1 and 2 on Figure 2) is recognised as being the fastest decrease in air pressure since data has been recorded. As a result of this a hurricane arose with airspeeds never observed before in this region.

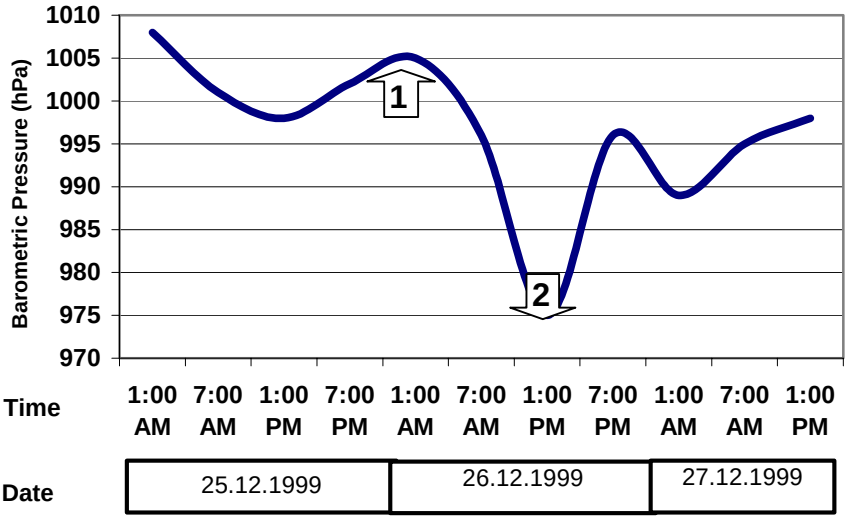

Figure 2. Evolution of air-pressure close to the storm centre

There is a concentration of FFEs in the south-west of Baden-Württemberg in the Black Forest region. An important part of this region (55%) lies within the centre of the storm damaged region and was heavily affected (Figure 3). More than 40% of the enterprises were affected with an amount of storm-felled timber more than the annual prescribed cut.

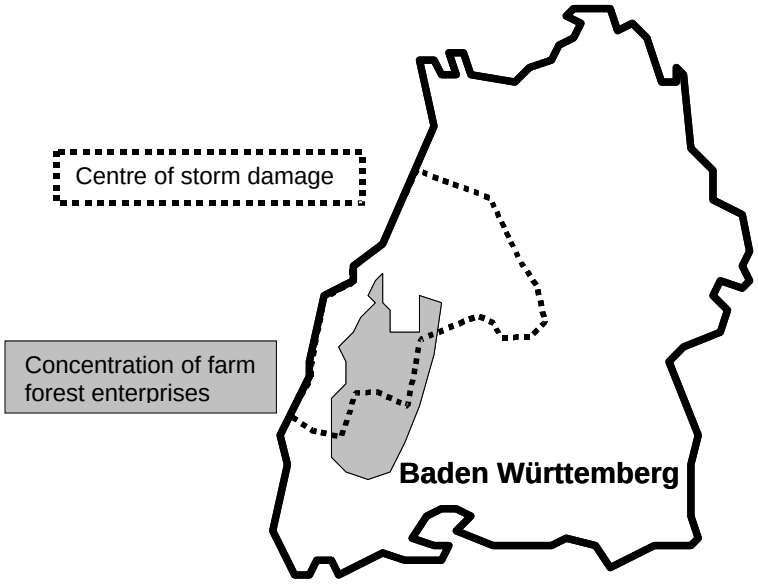

Figure 3. Overlap of the centre of storm and spatial distribution of FFE

As a consequence of this overlap, approximately 5.2 M m^3 of the wind-thrown timber came from private forests. A comparison between the types of ownership shows that this group suffered the most serious losses and the amount of wind-thrown timber was almost four times the prescribed annual cut (Table 1). The damage in state-owned forests was of similar magnitude. Community forests and larger private properties were also severely affected, but not as much as the forests of smaller private forest owners. Farm forestry was much more severely affected by the disaster in 1999 than by the storm event of 1990. This was especially the case in the increased number of farms with more than twice their annual prescribed cut wind-thrown (also see Table 6). Obviously damage of this magnitude cannot be overcome in a short time.

Table 1. Storm damaged timber by ownership class, year 2000

Ownership class	Volume of thrown timber (M m^3)	Storm coefficient [a]
FFE (< 200 ha)		386%
Private forests (> 200 ha)	5.2	241%
State-owned forests	9.2	333%
Community forests	11.4	273%

[a] The coefficient is defined as *the average regular annual cut / volume of storm-felled timber * 100.*

DATABASE OF THE ECONOMIC ANALYSIS AND EVALUATION OF STATE SUPPORT

Monitoring of the Economic Situation of Farm Forest Enterprises

Due to the importance of farm forestry in the state of Baden-Württemberg and in order to document the economic situation of FFEs, a farm forest accountancy network has been maintained since 1978 (Nain 1998). With an average of more than 500 attributes per enterprise and year (the potential number of attributes in the underlying relational database is much higher), this network is the most detailed long-term database of farm-forest economic data in Germany. As shown in Table 2, this database provides information over all parts of the enterprise. Proceeds and expenditures account for 30% and 35% of the data respectively, and are the most important part of the database. Data can be structured in various ways, e.g. by cost category, cost units or ownership size classes. The database enables a detailed description of the economic impacts and allows simulations to be developed.

Data from community forests and private forests with an expanse of more than 200 ha are documented in a second network, which is part of the federal forest accountancy network. This network provides similar information for these ownership types (BMVEL 2002). Differences between the networks are not relevant for the subsequent findings.

In the analysis reported here, where no other source is mentioned, data have been derived from these accountancy networks, primarily from the farm forest accountancy network. In order to provide detailed insights into the economic impacts of the storm-catastrophe, in most cases time series beginning from 1989 are described. This allows comparison of the storm impacts from 1999-2000 with those of the 1990 storm disaster in Baden-Württemberg. In some cases this comparison allows some generalising statements to be made about the effects of storm disasters in this region.

Table 2. Structure of contents in the farm forest accountancy networks

Content	Proportion of data held (%)
Standard data	<5
Structure of forests	15
Cutting volume, selling volume	10
Proceeds	30
Share of allowances (from proceeds)	≈50
Expenditures	35
Manpower input, salaries[a]	<<1[a]
Owners family	< 5
Machinery	< 5
Others	< 5

[a] Information on manpower input can also be found under the category Proceeds.

Opinion Poll as a Method to Evaluate Forest Owners' Satisfaction

Most of the 260,000 private forest owners and about 1000 communities are customers of the state forest administration. In order to evaluate client satisfaction during the storm period, the administration decided to conduct an opinion poll among private and communal forest owners. This survey was carried out between November 2001 and January 2002 with the participation of 25 communities and 29 private forest owners (LFV 2004). The major intention was to generate a *qualitative insight* into public opinion concerning this matter, and the sample size was judged to be adequate for this purpose. Another intention of the administration was to obtain suggestions for the development of future management strategies for natural disasters. Face-to-face interviews were conducted with responses recorded on tapes. The opinion poll contained mainly 'open-ended questions', in order to gain comprehensive insights into all areas of help offered by the state. The analysis was carried out in five steps, following the theory of Lamnek (1995). These steps are transcription, generating thematic outlines of each interview, generating matrices of topics, assigning the single statement to topics and finally analysing topics of greatest importance.

OVERVIEW OVER THE EFFECTS OF THE STORM ON KEY ECONOMIC INDICATORS AND OWNER STRATEGIES

Development of Expenditures after the Storm

For reasons of timber quality management and mitigation of pest risk (e.g. bark beetle), there was a need to process the storm damaged timber in a reasonably short period. Consequently, the total yearly expenditure increased after the storm disasters in 1990 and 1999. Especially in the year 2000, the huge amount of storm-damaged timber caused a doubling of expenditure. In particular, the rate of financial input for material and work contracts increased by 10% (absolute) or more than 25% relative (Figure 4). This makes evident that it was unavoidable to integrate more external input into the FFEs and as a consequence the higher demand for liquidity (about 10%) was difficult for owners to finance. In all cases where the direct marketing of storm-felled timber was impossible and the storage of the timber became necessary, a time lag of one to four years between the accrual of the processing cost and refinancing by the timber sales had to be bridged. This was in addition to increasing costs, e.g. for maintenance of forest infrastructure and regeneration operations.

Though the FFEs were not able to avoid the cost-intensive integration of external input, they undertook assiduous efforts to limit it to the lowest feasible level. A comparison between the different responses to storm damage provides insights into the different strategies adopted by the FFE.

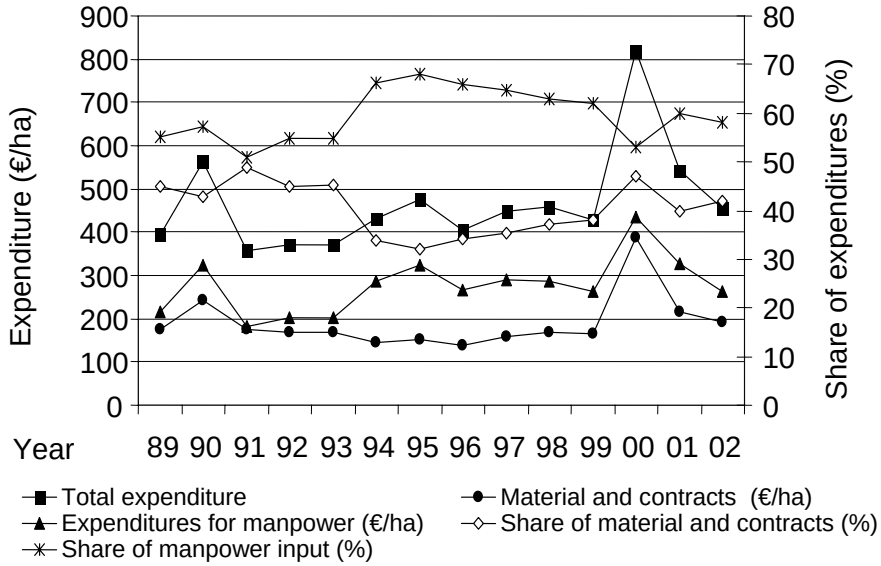

Figure 4. Amount and structure of expenditures

Rate of Self-Processing

Within the period 1989-2002, the rate of self-processing started to vary between types of forest ownership. The damage of the hurricane of 1990 was processed by landholders' own capacities on all types of forest ownership. In the year 2000, the rate of own processing decreased dramatically to a common level of about 35% (Figure 5), except for the FFEs, which maintained a self-processing rate on a high level.

Figure 5 raises the question of what enabled FFEs to maintain such a high level of self-processing, particularly given the extreme impact of the storm on the FFEs. To gain an insight into the causes, it is necessary to examine topics such as investment policy, efficiency and the significance of family work and neighbourhood linked to the results of the opinion poll.

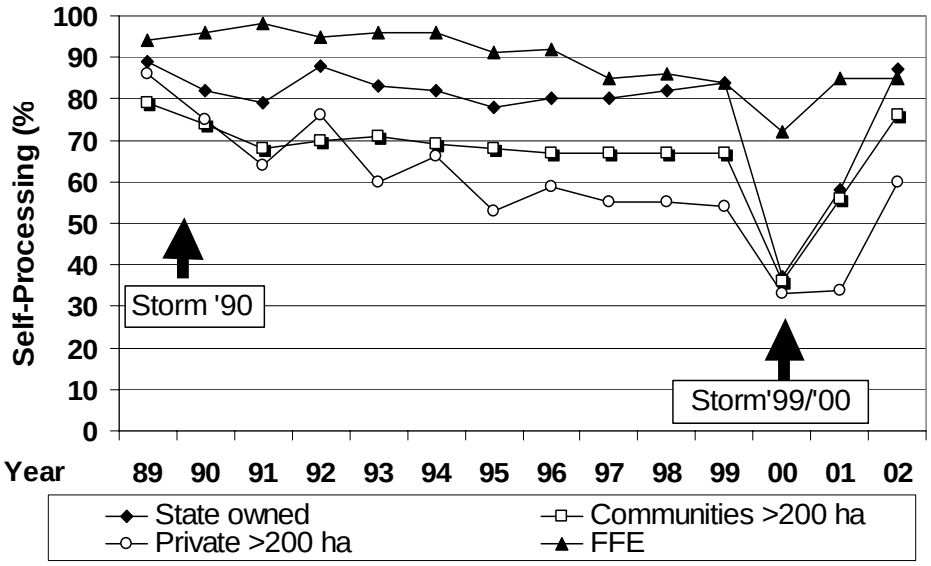

Figure 5. Rate of timber processed by own workers or family members

Self-processing and Earned Income

The self-processing rate was much higher in FFEs than for all other property types. In order to obtain information about the economic basis for this, a comparative approximate calculation was carried out which was able to explain important parts of the differences between individual farm forest regions. It showed that the decision of the owners to increase the input has a rational economic basis.

Log-processing costs (in €/m^3) are known from the accountancy networks. During the year 2000 the external input was focused mainly (>95%) on timber processing. Therefore it is possible to simulate additional amounts of timber processed by contractors input by changing the rate of external processing (point 1 on Table 3, simulation for financial year (FY) 2000). Multiplying by the average costs for log processing (point 2), one can calculate in a third step the additional expenditure and simulate the earned income (point 3). Table 3 reports the calculation scheme concerning the Black Forest region.

Results from the accountancy networks reveal that there were great differences in processing costs and share of self-processing between regions. Therefore the simulation was carried out for each region and the whole federal state in 10% steps of external input (Figure 6).

The gradient of the single graph shows the course of the calculated income in relation to the ratio of external work input. The black arrows indicate the actually realised income (in €/ha) in the individual regions. The income derived is strongly related to amount of the annual cut. The gradient in the single graph depends on the individual processing costs. Looking at the whole range between 0 and 100% of external processing, it becomes obvious that there is a difference of nearly 50% between the self-processing option and complete outsourcing. A conclusion is that the owners were able to influence their income over a wide range.

Table 3. Calculation scheme of the effects of a different rate of self processing

Category	Unit	Actual FY 2000 (23% external processing)	Simulation FY 2000 (65% external processing)	Difference
Timber harvested	m^3/ha	25.0	25.0	
Volume of harvested timber self-processed	m^3/ha	19.2	8.75	
External processing thereof	m^3/ha	5.8	16.25	10.45
Log processing cost	€/m3			25.13
Total cost for external processing	€/ha			263
Earned income	€/ha	620	357	

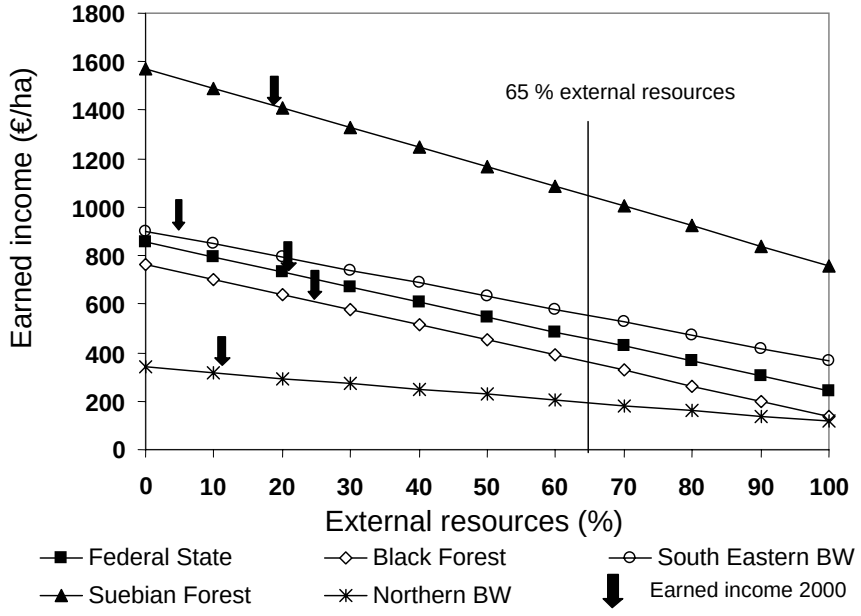

Figure 6. Relationship between external work Input and earned or family income

Table 4 provides an overview over the differences between the actual results of 2000 and a calculation level of 65% which was the share in all the other ownership types. What emerges is a clear difference as a result of the strategic decision of the FFEs. Using the state-wide difference for all FFEs in the size class of the members of the

accountancy network, a difference of about 30 M € was retained by the farm families by intensifying the family work input. An examination of investment policy and efficiency gives an appropriate explanation for this success.

Table 4. Change of earned income in relationship to different share of external input

Category	Baden-Württemberg (BW)	Black Forest	South Eastern BW	Suebian Forest	Northern BW
Share of external input, actual (%)	21	23	4	19	11
Earned income 2000, actual (€/ha)	731	620	884	1384	313
Earned income at common level of 65% external input (€/ha)	456	357	553	1044	193
Difference (€ / %)	275 / 38	263 / 42	331 / 37	340 / 25	120 / 38

Investment Policy

It is evident that years of storm damage are years of increased investment activity (Figure 7). Even if the owners expected decreasing sale prices for their products (and thus a decline in family income), they invested in forestry equipment. These effects can be shown in the year 1990 and especially in 2000 where investment (in €/ha) has tripled. This reaction can only be explained by the intention of the owners to enhance productivity in order to keep the rate of self-processing high. In the steep stands of the Black Forest, especially under the conditions of wind-thrown timber, the processing of the logs often requires the assistance of ground cable. Therefore, the investment rate increased due to purchases of, for example, cables and winches, which is one identified explanation for increased expenditure.

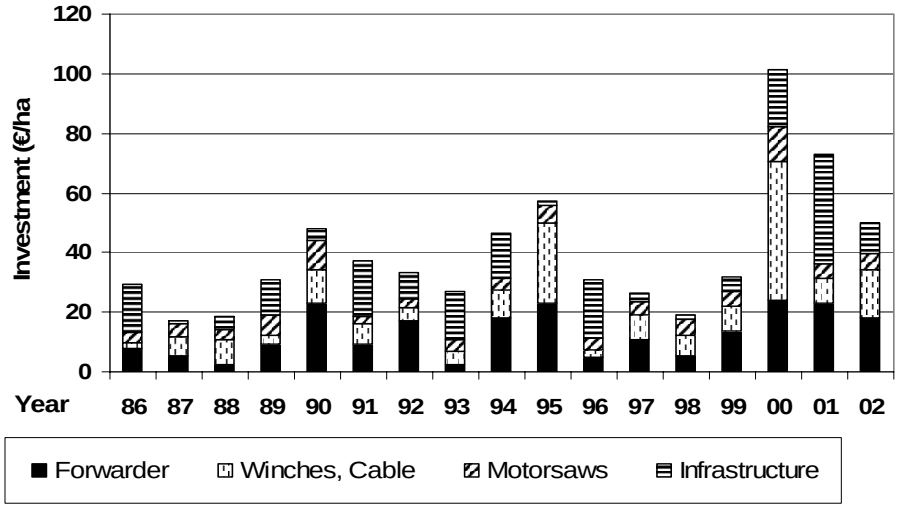

Figure 7. Time series of forest investment

Efficiency and Input of Own-Farm Capacities

The improvement in productivity cannot be attributed to investment policy alone. Comparing the processing strategies of the FFEs with community and State Forest enterprises, it was possible to show that the owners increased the labour input (man-hours/ha) spent in their own woodlots in order to reduce expenditures for hired workers or forest service enterprises. Comparing 1999 and 2000 the increase of hours per hectare amounted to more than 85% (Figure 8). In combination with a tremendous escalation of their efficiency (m^3/hour, increase of 57%, Figure 8), they were able to process almost three times as much timber (1.85 * 1.57= 2.91).

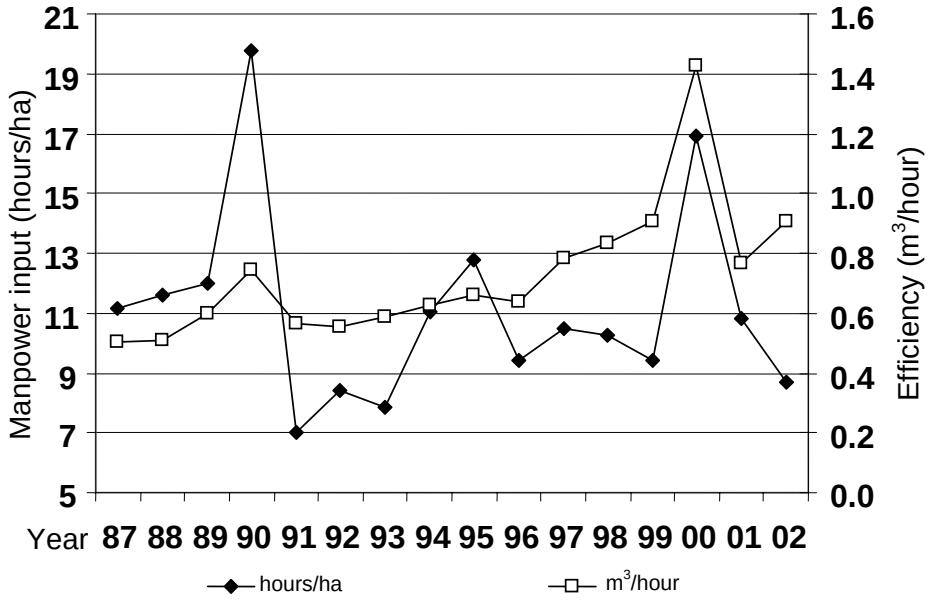

Figure 8. Manpower input and efficiency of timber processing

Development of the Proceeds

More than 90% of the earnings from forests (without allowances) come from timber sales. An understanding of sale prices is central to explain the returns on timber processing in year 2000 and following years. About 80% of the timber-based proceeds result from the sale of softwood sawn logs. That is why the main focus has to be on the changes seen in the prices of this timber assortment. Most of the storm-damaged timber was softwood sawn logs, and because of the big volume increase the price of this assortment decreased dramatically; within three months prices dropped from 76 €/m^3 to 47 €/m^3, a fall of almost 40% (Figure 9).

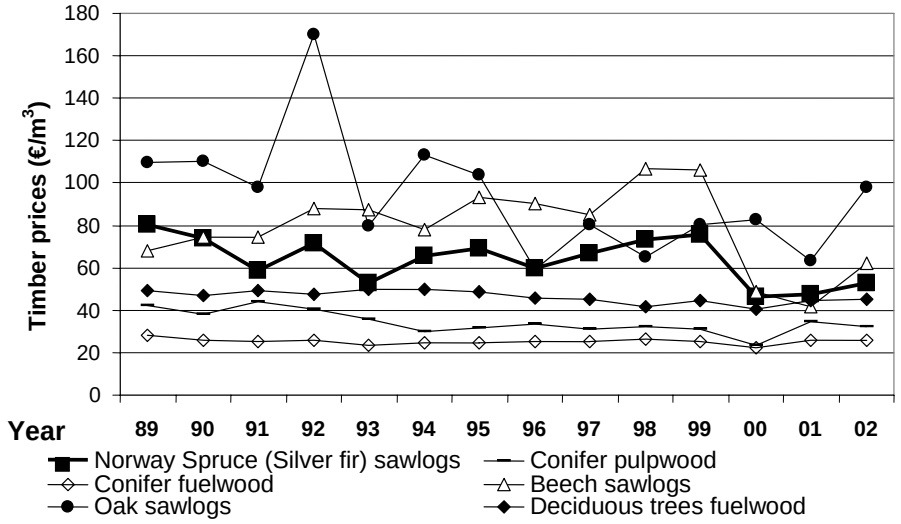

Figure 9. Movement of log prices due to hurricane 'Lothar'

Family Income and Operating Results

Although log prices decreased rapidly, the earned income of the FFEs in the period of processing increased, as a result of the high quantities of timber sold. The income adjustment for the FFEs becomes evident at the beginning from the second year after the storm, when no substantial compensation for the high volumes sold was given (Figure 10).

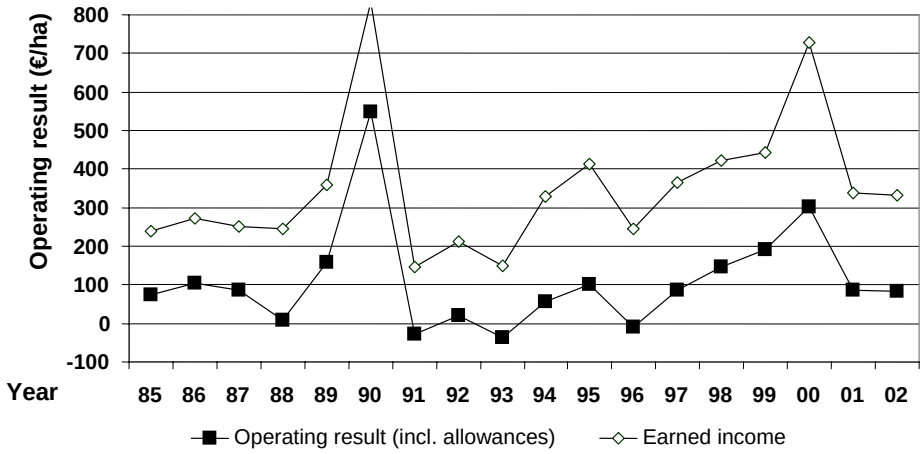

Figure 10. Operating results and earned income of FFEs

The difference between the earned income and the operating result is primarily due to the calculated costs for family work. Important for the FFEs is the fact that the loss of about 100 €/ha/year, which can be seen after the storm disasters in 1990 and 1999-2000, substantially reduced the contribution of the forest to the total family income (Figure 10). The average estate of a member in the accountancy network is about 24 ha. The storm gap resulted in a loss of 2400 € or about 10% of the average annual farm income of about 26,000 € in Germany.

Long-term Economic Impacts of the Hurricane 'Lothar'

The accountancy network database enables an economic comparison of the impacts related to the quotient of regular annual cut to the quantity of wind-thrown timber (Brandl and Nain 2000). Five variations were calculated on the basis of an enterprise with 40 ha forest area (Table 5):

1. Enterprise with the average results of the year 1998-1999 (reference level)
2. Enterprises with amounts of storm-felled timber of
    a. 8.0 m³/ha (≈ annual cut)
    b. 20.0 m³/ha (2.5 times the rate of annual cut)
    c. 40.0 m³/ha (5 times the rate of annual cut)
    d. 80.0 m³/ha (10 times the rate of annual cut).

Table 5. Short and medium-term economic perspective

Variation	1 Reference 1998-1999	2a 8.0 m³/ha	2b 20.0 m³/ha	2c 40.0 m³/ha	2d 80.0 m³/ha
	Short term perspective (1- 5 years)				
Regular annual cut (m^3)	320				
Wind-thrown timber (m^3)		320	800	1,600	3,200
Storm coefficient		100	250	500	1,000
Earned income 2000-2001 (€/year)	30,000	14,600	28,700	44,800	74,800
Income based on diminished natural assets			14,100	30,200	60,200
	Medium term perspective (> 5 – 10 years)				
Annual cut (m^3)		320	270	170	120
Annual cut (m^3/ha)		8.0	6.7	4.3	3.0
Earned income	30,000	27,600 [a]	21,400 [b]	12,650 [b]	7,250 [b]
Difference (€ / %)		2,400 / 8	8,600 / 29	17,350 / 58	22,750 / 76
Share of enterprises 1990		66	23	9	2
Share of enterprises 2000		57	23	11	9

[a] The key factor is medium-term price reduction.
[b] The key factors are medium-term price reduction and reduced annual cut.

Using data of the accounting system of the state-owned forest enterprise and the two accountancy networks in Baden-Württemberg, the most important types of proceeds and expenditures were forecast for each variation on the base of an Excel spreadsheet calculation. Table 6 provides an overview on the changes and the

underlying factors as a basis for cash flow simulations in relationship to the amount of storm-felled timber. The dimension of the shift in expenditures was mainly influenced by the results of the years after the 1990 storm.

Table 6. Changes and key factors in the various types of proceeds and expenditure

Type of proceed or expenditure	Change	Key factor
Proceeds from timber selling	↓	Productive stand area and prescribed annual cut decrease as a result in strong relationship to area of storm damages. A higher storm coefficient results in a higher loss of productive stand area and thus the decrease of future proceeds.
Proceeds from timber selling	↓	Recovery of timber prices needs more than 5 years.
Other proceeds	=	
Expenditures		
All types of fixed cost	=	- / -
Harvest operations	↓	As a result of reduced harvest volumes variable cost are decreasing.
Silvicultural operations	↑↑	Strongly increasing due to greater demand for planting, and silvicultural operations in plantations.

Applying these forecast data for the five variations, it becomes obvious that enterprises with wind-thrown timber amounting to more than 100% of the annual cut are losing an important part of their economic base. An FFE with storm damaged timber greater than five times their annual cut faces a 60 % fall in their income. A 10-fold increase in annual cut due to storm damage indicates the need, if there is no state-run support, to change to other economic activities. As a result of the storm Lothar, almost 10% of the FFEs faced such a severe economic loss (cf. 2% in 1990).

On the basis of these results the government established a special long-term subsidy program to create the opportunity for farm forest enterprises to continue with forestry. Only growers with a minimum estate of more than 20 ha and an amount of storm damaged timber of more than 40 m³/ha qualified for this assistance.

Strategy in the Mirror of the Opinion Poll

The survey of opinions showed that private forest owners made an active decision to process the wind-thrown timber mainly through their own efforts. People accepted assistance in planning and organising their harvesting operations (40%) and especially the joint marketing offers of the administration (> 70%). On the other hand, the demand for joint harvest operations and the placement service for logging enterprises was less important. In fact, the interviewees indicated that the additional help of family members and neighbours were the key factors in enhancing the families' working capacity. This corresponds to a detailed analysis of the network data. During the storm year 2000 about 10% more persons worked in the forests. The 'traditional' family workers increased their input by 30% compared to the data of 1999. Overcoming the storm damage in the private forest enterprises was

characterised by the owners as a challenge for the whole family and a social achievement (LFV 2004).

THE SIGNIFICANCE OF STATE-RUN SUPPORT

Under the framework of the integrative forest administration, the support of private and community forest enterprises became one of the most important objectives. There were three areas on which this support focused, namely: tax policy; allowances and joint sale; and technical support and information policy. In the combination of the three categories of state-run support, private forest owners and communities received more than 200 M €.

Depending on the intensity of damage, the income tax for forest enterprises was partially or totally remitted. In order to relieve the timber markets, delayed processing of the storm-felled timber was taxed at reduced tax rates. Costs for the regeneration of the storm-felled areas were accepted as current expenditures and became immediately tax deductible. In the case of destruction of industrial premises a higher depreciation rate was permitted.

In the past, allowances were not of great importance to the private forest owners. A 20-year retrospective view shows that the average contribution to the proceeds from subsidies amounts to only about 20%. The share of allowances on the operating result varies considerably. It is obvious that allowances have been increased after the storm damages in 1990 and 1999-2000. During the periods after severe storms, however, the assignment of subsidies is crucial for many enterprises. Looking at the periods 1990-1992 and 2000-2002, 86% and 55% of the operating result were subsidies. In the most affected regions, only subsidies guaranteed a positive operating result for most FFEs (Figure 11).

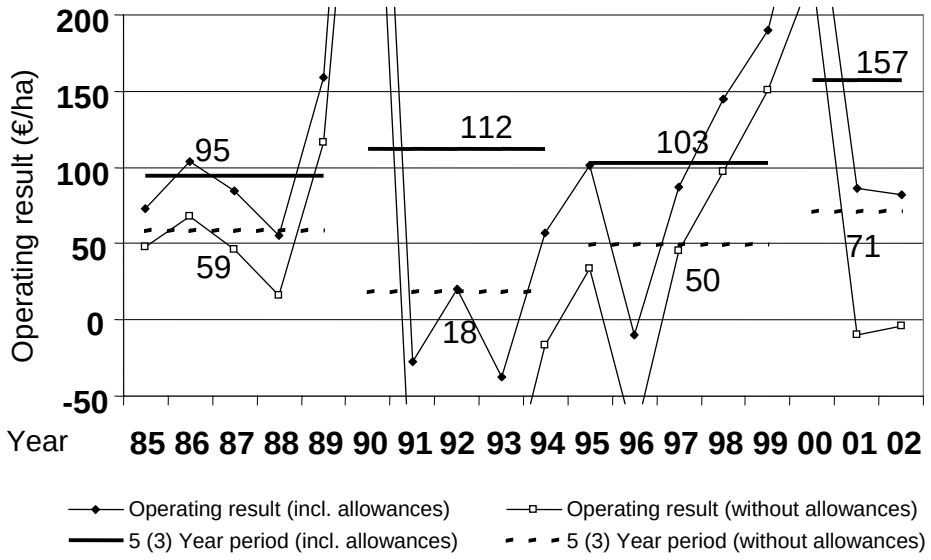

Figure 11. Coherences between allowances and the operating result in FFEs

Types of Subsidy Programs

The Ministry of Food and Rural Development established three types of support programs. The transport of logs to wet lumber yards, debarking of coniferous trees, storing in wet lumber yards and the clearing of the storm damaged areas were subsidised with *fixed amounts*, based on either timber volume or stand area. This kind of support was chosen in all cases where the costs could be defined with sufficient precision in advance, for example out of the accounting system of the state-owned forest enterprise or from experience of the storm in 1990. Table 7 provides an overview on type and amount of these direct subsidies.

Table 7: Subsidies paid by fixed amounts

Subsidy category	Amount
Transport of storm damaged timber to wet lumber yards or dry storing facilities	5.10 €/m^3
Storing in wet lumber yards	3.10 €/m^3
Debarking before storing in dry storing facilities	2.56 €/m^3
Clearing of the ground of storm damaged areas (if market value of timber was less the 511.30 €/ha	1,022.60 €/ha

Costs of the construction of (private or municipal) wet lumber yards, dry-storing facilities, overhauling of forest road infrastructure and regeneration operations were co-financed with *a percentage of the costs incurred* (Table 8).

Table 8. Subsidies paid by percentage of incurred costs

Subsidy category	Percentage	
Costs of construction of storing facilities	40% of the incurred costs	
Overhauling of forest infrastructure	40% of the incurred costs up to a total amount of 25,565 €, 50% beginning from 25,565 €	
Improvement of natural regeneration, replanting, advance planting	Only deciduous trees	4,090 €/ha
	Mixed stands	2,556 €/ha
	Improvement of natural regeneration	767 €/ha

Costs for processing and subsidies for re-establishing heavily affected enterprises were facilitated with special *loan programs* at reduced interest. The loans were of medium term (3 – 4 years duration), adapted to the maximum storing period in wet lumber yards. After this time, timber is in danger of being devalued by fungi or insects. There was a reduction of 4.5% of the interest rate, compared with the average market interest rate. In order to reduce the administration effort, a minimum loan amount of 5,113 € was set. Initially this program focussed on FFEs with a forest estate of less than 200 ha. As a consequence of the high concern over private (and municipal) forest with more than 200 ha, after three month forest estates with more than 200 ha were also subsidised (Table 9).

Table 9. Overview over the loan programs

Loan program	Conditions
Baden-Württemberg Loan for processing costs	Minimum Amount: 5,113 € Credit period: 3-4 years Reduction of interest rate: 4.5%
Federal Republic of Germany Loan for all kind of storm-related operation costs and short-lived economic goods	Reduced market interest rate (variable) Credit period: 4-6 years First year without amortisation
Federal Republic of Germany Loan for harvesting machines, reforestation, damaged assets or long-lived economic goods	Reduced market interest rate (variable) Credit period: up to 20 years First three years without paying back Maximum amount 260,000 €

Specialised Subsidy Program for the Maintenance of Operation

Knowing that farm forestry in the Black Forest and in some other parts of the state was severely affected, the Forest Research Institute of Baden-Württemberg examined the conditions under which a specialised subsidy program could be established to support FFEs that had lost an important part of their economic base. Using data from the farm forest accountancy network, some simulations were carried out to gain an overview for what kind of enterprise such a maintenance program could assist and whether the program would be affordable. As a result of the simulations, a subsidy program was introduced, to pay for the maintenance of forest enterprises. In order to control costs and identify FFEs that should be targeted for support the program adopted specific criteria as listed in Table 10.

Table 10. Overview of the farm forest maintenance program

Rule	Intention
FFE with more than 20 ha	Only enterprises, which are more dependent from forest income, should be included
Average amount of storm damaged timber more than 40 m^3 / ha	Focus on most severely affected enterprises
Amount of revenues less in all areas of the enterprise (also off farm employment) than 92000 €/year	As a result of the intention to subsidy only enterprises which are more or less dependent from forest income
Amount of payment	**Circumstances**
100 – 256 € /ha	Financed only by the state of Baden-Württemberg
Running time 10 years	

Joint Sale, Consultation and Information Policy

Private forests received various forms of assistance. The forest officers organised information services including meetings. Many personal contacts with private forest owners served to advise them in all areas of interest, beginning with log-processing

strategies and technology, continuing with marketing strategies and finally suggesting methods of stand regeneration.

The state-owned forest organised joint long-term timber contracts to facilitate the sale of timber from small properties. In a time when markets were accustomed to large selling volumes, it was evident that sales from small woodlots would become almost impossible. Whereas the processing of the timber was mostly carried out by the owners, more than one half of the interviewees stated that they used the marketing services offered by the state forest administration.

The State Ministry of Baden-Württemberg for Food and Rural Development had decided that priority should be given to private forest owners for wood sales resulting from the storm. The regional offices were obliged to advise the communities to act in that way as well. This strategy proved successful, in that about one year after the hurricane, 93% of the storm-felled timber out of private forests had been sold (Table 11). The rate of the state-owned forest and the community forests was much lower and reached a uniform level of approximately 70%.

Table 11. Share of processed and sold timber in the different properties

Ownership type	Processed timber (M m^3)	Sold timber (M m^3)	Sold timber relative to processed timber (%)
Federal State Forest	7.0	5.0	71%
Community Forest	10.6	7.6	72%
Private Forest	4.2	3.9	93%

Owners complained about the decrease of timber prices, but not as a result of the marketing policy of the forest administration. There was almost complete acceptance of the state marketing solution to the sale of storm damage FFE timber. There were only a few areas of disagreement. Some people were not satisfied with the conditions under which allowances were paid. This problem arose often when precise limits were imposed on subsidies.

DISCUSSION AND CONCLUSIONS

Analysis of the data from the accountancy networks shows that storms must be regarded as the most significant risk for farm forest enterprises. The small size of enterprises means that compensation for the loss of productive stand area is not immediately feasible from increased sales for reasons of sustainability. The period of processing the logs is less critical because the income of the FFEs increases rapidly as a result of the high selling volumes. Even when the timber prices fell sharply, it was possible in most cases to pay for the direct harvesting costs and all kind of silvicultural operations during the first one or two years.

The most severe long-term effect of a major storm is the reduction of the natural asset base. That is why a 10-year period after the storm will become a period of reduced supply. It can be shown that the predicted operating income for the next 5-10 years is strongly related to the quotient of regular annual cut and the quantity of storm-felled timber. The simulation forecasts of cash flows suggest that enterprises with wind-thrown timber amounting to more than 100% of the annual cut suffer from a reduction in their economic base. A higher storm coefficient means the

destruction of the economic base. Any storm can be identified as a more-or-less medium-term risk.

Two crucial points have been identified, which cause these problems. First, the fixed costs, which are relatively independent from the harvesting volume, have to be covered by a lower annual cut. There is normally no chance of enhancing the cutting volume without exceeding sustainable yields. Second, the FFEs, which are in many cases dependent from a mixture of several income sources, are losing the most cost-effective kind of labour. Especially, the loss of the possibility to compensate the lower work-activity in agriculture during the winter period by enhancing forest work input causes 'structural unemployment' of the owner and other family workers.

Comparing the processing strategies of FFEs with community enterprises or the State Forest, it can be shown that the owners were able to increase the number of man-hours spent in their woodlots in order to reduce expenditures for contingent workers or forest service enterprises. The escalation of their efficiency in processing timber – e.g. by investing in better technologies and by using advanced methods of operation – enabled them to process three times the normal quantity of timber. The FFEs demonstrated themselves to be the most flexible ownership class in such a situation. The data from the accountancy networks as well as the results of the opinion poll provided evidence for the hypothesis that the forest owners made an active decision towards self-processing. Beside the state-run support, enhancing this strategy can be considered as an efficient way, and perhaps the only way, to mitigate the economic losses. The owners are more-or-less aware that neither the external costs nor the timber prices can be influenced by the enterprise. The key issue regarding influence focuses on the question whether the workforce is family-provided in the enterprise by using family or neighbourhood labour or whether to hired paid contract workers. Simulation suggests that the owners reduced the financial damage in 2000 by millions of Euro by applying this strategy.

It is evident that state-run support plays an important role after such storm disasters, especially considering that there is no insurance-solution (for damages resulted by storm disasters) developed in Germany. Most owners are not able to overcome such situations without help. The evaluation of the state-run support shows that only a combination of different measures is suitable and even then can provide only limited help. There is a need for more than financial allowances in state provided support schemes. Information and marketing offers are equally important for the farm forest enterprises. A forest administration system such as that in Baden-Württemberg, combining responsibility for all ownership-classes with the management of a state-owned forest enterprise is well suited to provide the required range of support-measures. The results of the qualitative survey provide evidence that the activities of the state administration were well-received, even under the conditions of crucial financial losses for the owners. Fifty percent of the interviewees had used the consulting services of the state forest administration. The interviewed persons predominately made positive evaluations. They were satisfied with both the quantity and accessibility of the information provided. Owners of small woodlots placed emphasis on the accessibility of the forest officers. The forest officers' willingness for cooperation was welcomed.

Using the results of the accountancy networks and the experiences from former storm-disasters, a new type of subsidy program was established which focused on the mid-term perspective. The 'Maintenance Program' supports enterprises with

severe storm damages for 10 years after such a catastrophe. State-supported subsidies such as these allow forest enterprises to remain financially viable after such catastrophic events. They also have additional benefits such as the management of landscapes, which is so important to tourism in the area. Finally, it can be stated that the support of forest owners after such disasters exceeds the dimension of forestry and becomes a part of landscape management and regional economy concepts.

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